STANDARD OPERATING PROCEDURE

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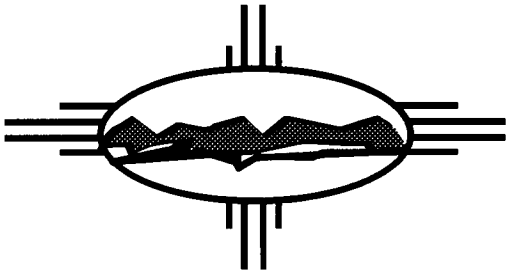
HIGH EXPLOSIVES SPOT TEST	**ER-SOP-10.06**	~~0~~ 1	3/10/98



ER PROJECT

APPROVALS FOR USE

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LOS ALAMOS NATIONAL LABORATORY

HIGH EXPLOSIVES SPOT TEST

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HIGH EXPLOSIVES SPOT TEST

1.0 PURPOSE

This procedure describes a high explosive spot test that can be performed in the field. The field method has been designed and provided by Explosives Technology Group, DX-2. The Spot Test and its results were reviewed and approved for use by the Los Alamos National Laboratory's Explosives Review Committee.

2.0 SCOPE

2.1 Applicability

This procedure applies to all personnel who will be testing for the presence of high explosives (HE) in homogenized soil that will be used for sample material.

2.2 Training

The field team leader and the sample team members who use this method must have been trained by a DX-2 representative. The DX-2 training must be documented, and trainees must document that they have read and understood this procedure in accordance with LANL-ER-AP-05.2, Determination, Completion and Documentation of Environmental Restoration Worker Training.

3.0 DEFINITIONS

N/A

4.0 BACKGROUND AND CAUTIONS

All documentation must be recorded in the field notebook or daily log per LANL-ER-SOP-01.04, Sample Control and Field Documentation. Deviations from the procedure must be recorded per LANL-ER-SOP-01.04.

HE sites are restricted. Follow LANL-ER-SOP-01.07, Taking Soil and Water Samples in Explosive Areas, for information regarding preparation of a facility work request per LIR230.03-01.1, Facility Management Work Control.

Once on site, follow the site-specific health and safety plan to ensure the protection of personnel performing this test. The HE Spot Test is used to screen for HE at sample locations as part of the safety protection for the field team members. However, a negative test result does not totally ensure that the location is free of HE; it only indicates that no HE is present in the small amount of soil used for the Spot Test. HE could still be present in the immediate area or even in the sampled material. Every precaution, including the use of the HE Spot Test, should be taken to keep all team members as safe as possible.

Please note that in the Chart for Use with the Modified Griess Reagent Spot Test for Explosives (Attachments A and B) an explosive is listed for which a color change would not be noted. The Spot Test usually frees the nitrogen from the explosive, thus indicating the presence of the high explosive

The reagents for the spot test include:

- Reagent 1: 0.1 molar sodium methoxide in DMSO
- Reagent 2: 10 mg/ml sulfanilimide in 0.2 molar hydrochloric acid
- Reagent 3†: 0.2 mg/ml N-1-naphthylethylenediamide dihydrochloride

† Reagent 3 is light-sensitive. Keep this reagent in the closed box when not in use.

All chemicals must be handled in a professional manner, using care to prevent splashing or spilling. Eye protection must be used when performing the test. Chemical-resistant gloves must be used. DMSO will penetrate the skin and carry chemicals into the bloodstream. Material Safety Data Sheets for the chemicals used in the kit should be on site and accompany the kit when transporting it on public roads to comply with Department of Transportation (DOT) regulations.

The Spot Test is not designed to give quantitative results. The concentration of HE in the sample is not the object of this test, and results of this method are not used as the basis for final remediation decisions. All samples that give a positive test result must be considered HE-contaminated regardless of the intensity of the color generated by the test.

5.0 EQUIPMENT

Modified Griess Reagent Spot Test for Explosives, as provided by DX-2

Small laboratory-type spatula, about 5 mm in width

Safety glasses or goggles

Chemical-resistant gloves

6.0 PROCEDURE

This test is to be performed on homogenized soil that is collected and is to be distributed to the sample containers.

A. Note any color change during the test. Use the Chart in the kit to determine the presence of specific HE. (The Chart is duplicated here in Attachment A.) If there is a color change, note the color and which reagent had been applied. Document the results in the field notebook and/or the sample collection logs. Negative results must also be documented in the field notebook and/or the sample collection logs.

B. Decontaminate the spatula if it is not new or there is a question about its previous decontamination.

C. Remove the filter paper from the kit. DX-2 provides a 5.5 cm diameter filter paper for this test, but other sizes could be used.

D. Scoop a small soil sample from the test location on to the filter paper using the spatula.

E. Apply a few drops of Reagent 1 to the sample. Note any color change. Check the Chart to identify the resultant color change indicated in the Reagent 1 column and the corresponding type of HE. Document positive results.

F. Apply a few drops of Reagent 2 to the same area of the sample.

G. Apply a few drops of Reagent 3 to the same area of the sample. Note any color change. Check the Chart to identify the resultant color change indicated in the Reagent 3 column and the corresponding type of HE. Document results in field notebook and/or sample collection logs.

H. Return the kit materials to the holding box. Be sure to put the bottles back into the plastic zip-lock bags containing kimwipes in order to comply with DOT regulations when transporting the kit.

I. Decontaminate the spatula.

J. Place the filter paper that contains the soil test material and discarded gloves and goggles in the appropriate waste container, following the site-specific Waste Management Plan.

7.0 REFERENCES

LANL-ER-AP-05.2, Determination, Completion and Documentation of Environmental Restoration Worker Training
LANL-ER-SOP-01.04, Sample Control and Field Documentation
LANL-ER-SOP-01.07, Taking Soil and Water Samples in Explosive Areas
Laboratory Implementation Requirement (LIR) 230-03.01.1, Facility Management Work Control
LANL-ES&H-AR-6-6, Explosives

8.0 RECORDS

Screening results can be recorded either in the Daily Activity Log or field notebook.

The field team leader is responsible for transmittal of all records that result from the use of this procedure to the ER Records Processing Facility.

9.0 ATTACHMENTS

Attachment A	Chart For Use with the Modified Griess Reagent Spot Test for Explosives
Attachment B	Commonly Used Abbreviations with Corresponding Chemical Names of HE

CHART FOR USE WITH THE MODIFIED GRIESS REAGENT SPOT TEST FOR EXPLOSIVES

To use this chart, follow the instructions in the Procedure Section of this SOP.

HE	Reagent 1 Resultant Color Change	Reagent 3 Resultant Color Change
NC	None	Purple
NG	None	Purple
PETN	None	Purple
RDX	None	Purple
TATB	Yellow Orange	None
Tetryl	Black-Red	None
TNT	Black-Purple	None

COMMONLY USED ABBREVIATIONS WITH CORRESPONDING CHEMICAL NAMES OF HE

HE Abbreviation	Chemical Names
NC	Nitrocellulose
NG	Nitroglycerine
PETN	Pentaerythrol tetranitrate
RDX	Hexogen. Cyclo-1,3,5-trimethylene-2,4,6-trnitramine
TATB	Triaminotrinitrobenzene
Tetryl	Trinitro-2,4,6-phenylemethylnitramine
TNT	Trinitrotoluene